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PATENT ABSTRACTS OF JAPAN

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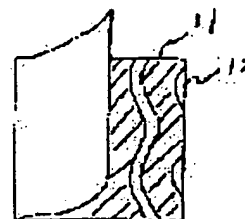
(72)Inventor : OSHIMA MASATOSHI

(54) SELF-ADHESIVE TAPE OR SHEET AND METHOD FOR APPLYING SELF-ADHESIVE

(57)Abstract:

PURPOSE: To provide a self-adhesive tape or sheet which allows air bubbles involved to easily go out on adhering to an adherend, enables accurate bonding, and does not cause rolling up of the hem of a substrate after adhered and to provide a method for applying a self-adhesive wherein a self-adhesive layer having a wavy-line pattern is formed for producing the self-adhesive tape or sheet.

CONSTITUTION: This self-adhesive tape or sheet comprises a substrate and a self-adhesive layer 11 which is formed on one side of the substrate and has a wavy-line pattern. The method for applying a self-adhesive comprises forming a layer of an acrylic-emulsion-based self-adhesive on a rotating coating roll of a two-roll coater consisting of the coating roll and a back-up roll, moving a comb blade placed on the coating roll periodically in the direction of the roll shaft to give the self-adhesive layer a wavy-line pattern, and transferring the layer to a release sheet.



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(54) Name of the invention: Removable Adhesive Sheet and Its Manufacturing method

(21) Filed Number: Hei-Sei 2-38574

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Patent Assignee: Dainippon Printing Company

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[Note: Names, addresses, Company names and brand names are translated in the most common manner. Japanese language does not have singular or plural words unless otherwise specified with numeral prefix or general form of plurality suffix. Translator's note.]

Description of the invention

1. Name of the invention

Removable Adhesive Sheet and Its Manufacturing Method

2. Range of the claims of the invention

(1) Removable adhesive sheet, characterized by the fact that on the front surface of a substrate plate an adhesive agent layer with a predetermined thickness is provided and together with that a large number of adhesive agent protrude shape bodies that are protruding in the outer direction from the front surface of the above adhesive agent base layer, are provided as one body with the adhesive agent base layer.

(2) Manufacturing method for the preparation of removable adhesive sheet, characterized by the fact that on the front surface of a release film that has a large number of indentations, an adhesive agent is coated thicker than the depth of the above described indentations, so that in these indentations an adhesive agent is filled and also, on the surface of that, continuously, an adhesive agent base layer with a predetermined thickness is formed, and then after that, on the front surface of the above described adhesive agent base layer, the substrate material is glued.

3. Detailed explanation of the invention

[Technological sphere of application]

The present invention is an invention about an adhesive sheet that has removable properties, and it is an invention about its manufacturing method.

[Previous technology]

In the past as the adhesive sheet used in labels, etc., the material has been widely used that can be removed after the adhesion onto the body that has been subjected to the adhesion, and also, it can then be used again. For example, as the paper used for memo, or discussions, the adhesive sheets that have removable properties have been known, like the adhesive sheets where the use conditions or the problem etc., is temporarily recorded and it is adhered onto the reference material, etc., and in the case when it is not necessary any more, it is separated and thrown away, or the temporary adhesion adhesive sheets where in order to confirm the adhesion position on the material that is the subject of the adhesion, it is temporarily adhered, and in the case when the position is erroneous it is removed and it is then adhered again, and then after that it is really adhered.

As such adhesive sheets, 1) the adhesive sheet where an adhesive agent layer is partially formed on the substrate material, as it is adhered in a network type of pattern by using a printing type method etc., 2) the adhesive sheet where spherically shaped adhesive fine particles are adhered onto the substrate plate on numerous position through the use of a binder material, (for example, the Japanese Patent Application Laid Open Number Showa 54-60661, Japanese Patent Application Laid Open Number Showa 55-42881), 3) the adhesive sheet where on the front surface of the substrate material semi-spherical shape fine particles are adhered on numerous positions so that their curved surface is towards the outside direction, and by that an adhesive agent layer is formed (for example Japanese Patent Report Laid Open Number Showa 57-57394) etc., have been suggested.

[Problems solved by the present invention]

However, in the case of the above described 1) and 2) adhesive sheets, in the case when they have been adhered onto the material subjected to the adhesion and after that they are removed and separated, the lattice (network) shaped adhesive agent layer or the adhesive fine particles remain on the side of the material that has been subjected to the adhesion, and because of that there has been the problem that the front surface of the material that has been subjected to the adhesion is soiled. Also, in the case of the adhesive sheet 3), because the adhesive agent has a semi-spherical type of shape, the bonding between the substrate material and the adhesive fine particles, becomes strong, and compared to the cases according to 1) and 2), it is possible to improve to a certain degree the problem of the remaining of the adhesive agent at the time of the separation, however, in the case of the manufacturing of the adhesive sheet, it becomes necessary to manufacture in advance the semi-spherically shaped fine adhesive particles, and especially, a complicated technological operation becomes necessary, whereby it is said that the adhesive fine particles are adhered onto the substrate material so that their curved surface is oriented towards the outer direction. Consequently, there has been the problem that the number of the manufacturing technological processes is increased

and together with that there has been the problem that in manufacturing it is said to be technologically difficult to adhere the adhesive fine particles so that their curved surfaces are totally oriented towards the outer direction.

In the case of the present invention, it is an invention that has as a goal to suggest a removable adhesive sheet where the above described drawbacks of the previous technology are resolved, and because of that, it is a material where it is possible to conduct an appropriate separation where at the time of the separation from the material that has been subjected to the adhesion, there is no adhesive agent remaining on the side of the material that has been subjected to the adhesion. And it is also an invention that has as a goal to suggest the manufacturing method for the preparation of this removable adhesive sheet.

[Measures in order to solve the problems]

The present invention is an invention that has the following essential components:

(1) Removable adhesive sheet, characterized by the fact that on the front surface of a substrate plate an adhesive agent layer with a predetermined thickness is provided and together with that a large number of adhesive agent protrude shape bodies that are protruding in the outer direction from the front surface of the above adhesive agent base layer, are provided as one body with the adhesive agent base layer.

(2) Manufacturing method for the preparation of removable adhesive sheet, characterized by the fact that on the front surface of a release film that has a large number of indentations, an adhesive agent is coated thicker than the depth of the above described indentations, so that in these indentations an adhesive agent is filled and also, on the surface of that, continuously, an adhesive agent base layer with a predetermined thickness is formed, and then after that, on the front surface of the above described adhesive agent base layer, the substrate material is glued.

Here below, the present invention will be explained in further detail based on the attached diagrams.

As it is shown according to Figure 1, The adhesive sheet 1 according to the present invention is formed from the substrate material 2 and the adhesive agent layer 3, that is formed on the front surface of the above described substrate material 2, and the adhesive agent layer 3 is formed from the adhesive agent base layer 4, that is provided at a predetermined thickness, and the large number of protruded shape bodies 5 of the adhesive agent, that are provided so that they are protruding in the outer direction, and the adhesive agent base layer 4 and the adhesive agent protruded shape bodies 5, are provided as one body from the same material. Regarding the horizontal cross sectional surface shape of the adhesive agent protruded bodies 5, it can be any of a point type shape, a linear shape, a lattice shape. And in the case of the point type shape, it is possible to be a circular shape, an oval

shape, a rotation parabola shape, a triangular shape, a square shape, etc., different types of shapes, however, especially the spherical type shape is preferred.

Also, regarding the vertical cross sectional surface shape in the protrusion direction, from the point of view of the properties appropriate for the repeated removal, the case is preferred where for any of the lattice shapes, in the direction of the protrusion, a smooth curved surface or a tapered surface, is formed, and especially, a semi-circular shape is preferred. As the preferred adhesive agent protruded bodies 5 three-dimensional shape, the semi-spherical shape is used.

Regarding the size and the number of the protruded bodies 5, it is in correlation to the material that is the subject of the adhesion and the removability properties. There are the trends that when the number of the protruded bodies is small and their density is low, sufficient adhesive force is not obtained, and also, in the case when the number is large and the density is high, the removability properties become poor.

Regarding the width of the bottom base part of 1 protruded body, usually, it is in the range of 1 ~ 300 microns, and for example, in the case of a semi-spherical type of shape, it is preferred that the diameter is in the range of 1 ~ 50 microns. Also, the height of the protruded bodies is in the range of 1 ~ 300 microns. Regarding the number of the protruded bodies, although it varies depending on their dimension, in the case of a semi-spherical shape when the diameter is in the range of 1 ~ 50 microns, these are usually formed at the extent of 1000 ~ 1,000,000 units/cm².

In the case of the adhesive sheet according to the present invention, it is a material where by the selection of the shape, the dimensions, the density and the type of the adhesive agent of the adhesive agent protruded bodies, it is possible to most appropriately control the repeated removability properties depending on the material that is the subject of the adhesion.

Regarding the thickness of the adhesive agent base layer 3 that is formed as one body together with the adhesive agent protruded parts 5, although it also depends on the size of the adhesive agent protruded bodies 5, usually, it is in the range of 1 ~ 100 microns, and preferably, it is in the range of 10 ~ 50 microns.

It is a good option if the adhesive agent base layer 3 is provided over the whole surface of the substrate material 2, and it is also a good option if it is provided partially on part of that surface.

As the adhesive agent that forms the adhesive agent layer 3, it is possible to use the usual acrylic type or rubber type adhesive agents, that have been used in the well know from the past adhesive tapes and seals, and it is possible to use a solvent type or an emulsion type adhesive agent. For example, it is possible to use materials where to any of the adhesive agents like polyisoprene rubber, polyisobutylene

rubber, styrene butadiene rubber, butadiene - acrylonitrile rubber, etc., rubber type resins, (meth)acrylic acid ester type resins, polyvinyl ether type resins, polyvinyl acetate type resins, vinyl chloride - vinyl acetate copolymer type resins, polystyrene type resins, polyester type resins, polyamide type resins, polychlorinated olefin type resins, polyvinyl styral type resins, etc., the appropriate amount of adhesion imparting agents, for example, rosine, danmaru, polymerized rosine, partially hydrogenated rosine, esterified rosine, polyterpenic type resin, terpene modified materials, petrol type resins, cyclopentadiene type resins, phenol type resins, styrene type resins, xylene type resins, cumarindene type resins, etc., has been added. And then depending on the requirements, it is also possible to use materials where a softening agent, filler agent, anti-aging agent, etc., are also added.

Regarding the substrate material 2, it is a good option if it is a material that can be used as a substrate material for the usual adhesive sheet materials, and for example, it is possible to use the following here below materials: aluminium, copper, iron etc., metal foil, polyethylene terephthalate, polybutylene terephthalate, polyethylene terephthalate / isophthalate copolymers, etc., polyester resins, polyethylene, polypropylene, polymethyl pentene, etc., polyolefin type resins, polyfluorinated vinyl, polyfluorinated vinylidene, poly 4- fluorinated ethylene, ethylene - 4 fluorinated ethylene copolymer material, etc., polyfluorinated ethylene type resins, Nylon 6, Nylon 6, 6 etc., polyamides, polychlorinated vinyl, chlorinated vinyl/ vinyl acetate copolymer materials, ethylene / vinyl acetate copolymer materials, ethylene / vinyl alcohol copolymer materials, polyvinyl alcohol, Vinyon, etc., vinyl type polymer materials, triacetate cellulose, cellophane etc., cellulose type resin materials, poly methyl methacrylate, polyethyl methacrylate, polyethyl acrylate, polybutyl acrylate, etc., acrylic type resins, polystyrene, polycarbonate, polyallylate, polyimide etc., synthetic resin films, or sheets, that can be a single layer materials or laminated layer materials, or it is possible to use top quality paper, thin leaf paper, gurashin paper, sulfuric acid paper, etc., papers, fabric material or non woven fabric material, that is obtained from one type or two and more types of glass fiber, natural fibers, synthetic fibers, etc.

There are no specific limitations regarding the thickness of the substrate material 2, however, usually, a material that has a thickness in the range of 12 ~ 200 microns, is used. Also, if it is necessary to increase the adhesive properties between the substrate material 2 and the adhesive agent layer 3, it is also a good option if the well known ease of adhesion treatments, like a corona electrical discharge treatment, plasma treatment, primer coating, de-oiling treatment, surface roughening treatment, etc., is conducted on the front surface of the substrate material 2.

In the case of the adhesive sheet according to the present invention, it is a material where, depending on its application sphere, it is possible to conduct the treatments in order to impart writing properties. For example, as it is shown according to Figure 2, if the surface of the substrate material 2, that is opposite to the surface where the adhesive agent layer has been formed, is used as the writing surface 6, it is also a

good option if the front surface of the above described writing surface 6 is treated by using the well known methods and by that the writing part 7 is formed.

As the method for the formation of the writing part 7, for example, there are the following here below methods: the method where fine particles containing resin is coated, the method where a substrate material is produced that contains fine particles, the method where on the surface of the substrate material sand blasting is applied, etc., already known methods where the surface is roughened, etc.

Also, depending on the requirements, it is possible that on one side or on both sides of the substrate material 2, a decorative layer 8, that is formed from a design, a thin metal film etc., is provided on the whole surface or on part of the surface by using the printing method, the vapor deposition method, etc.

As it is shown according to Figure 2, in the case of the adhesive sheet 1 according to the present invention, the adhesive agent protruded bodies 5 are unified as one body with the adhesive agent base layer 4, and because of that, they are strongly adhered onto the substrate material 2, and the fixing force relative to the substrate material 2, is strong. As a result from that, at the time when the adhesive sheet according to the present invention that has been glued onto the material 9 that is subjected to the adhesion, is then separated, the problem where it is said that the protruded bodies 5 are removed from the substrate material 2 and remain on the surface of the material 9, that has been subjected to the adhesion, does not exist, and it is an adhesive sheet material where it is possible to conduct a good separation.

After that, an explanation will be given regarding the manufacturing method for the preparation of the adhesive sheet according to the present invention. As it is shown according to Figure 3 (a), a release type film 11, that is formed as a large number of indented parts 10 is provided, is used, and on the front surface of this release type film, as it is shown in (b) of the same figure, the adhesive agent is coated thicker than the depth of the indented parts 10. Namely, the adhesive agent completely fills the indented parts 10, and together with that on the surface of that, continuously, an adhesive agent layer with a predetermined thickness is formed. After that, as it is shown in (c) of the same figure, on the front surface of the adhesive agent layer 3, the substrate material 2 is glued, and by that the removable adhesive sheet 1 is obtained.

According to the above described technological process, the adhesive agent that is filled into the indented parts 10 forms the adhesive agent indented bodies 5, and on the top of that, continuously, the coated so that it has a predetermined thickness adhesive agent forms the adhesive agent base layer 4.

As the shape of the indented parts 10 of the release type film 11, it is a good option as long as it is shape that corresponds to the shape of the above described adhesive agent protruded bodies 5. And as the method for the formation of the indented parts

10 in the release type film material 11, it is possible to use the well known from the previous technology, heat - pressure embossing processing etc.

Regarding the material of the release type film material 11, as long as it is a material where the adhesive force in the space between the release type film 11 and the adhesive agent layer 3, is smaller than the adhesive force in the space between the substrate material 2 and the adhesive agent layer 3, there are no specific limitations.

As the material used for the release type film material, it is possible to use the following here below materials: polyethylene terephthalate, polybutylene terephthalate, polyethylene terephthalate/ isophthalate copolymer material, etc., polyester resins, polyethylene, polypropylene, polymethyl pentene, etc., polyolefin type resins, polyfluorinated vinyl, polyfluorinated vinylidene, poly 4 fluorinated ethylene, ethylene - 4 fluorinated ethylene copolymer materials, etc., polyfluorinated ethylene type resins, Nylon 6, Nylon 6,6, etc., polyamides, polyvinyl chloride, vinyl chloride/ vinyl acetate copolymers, ethylene/ vinyl acetate copolymer materials, ethylene / vinyl alcohol copolymer materials, polyvinyl alcohols, Vinyon etc., vinyl type polymer materials, cellulose triacetate, cellophane, etc., cellulose type resin materials, poly methyl methacrylate, polyethyl methacrylate, polyethyl acrylate, polybutyl acrylate, etc., acrylic type resins, polystyrene, polycarbonate, polyallylate, polyimide etc., synthetic resin films, or sheets, that can be a single layer materials or laminated layer materials, or it is possible to use top quality paper, thin leaf paper, sulfuric acid paper, etc., papers, etc.

Also, in order to make the separation between the release type film 11 and the adhesive agent layer 3, it is possible to apply a release type treatment. Regarding the release treatment, it can be conducted prior to the providing of the indented parts 10 on the release film 11, or it can also be provided after the indented parts 10, have been provided.

As the release treatment, for example, the method can be used where a coating material that is obtained as fluorine type resin, paraffin wax, Montana wax, synthetic wax, etc., wax type material, or silicone etc., release type agents, are added in well known vehicle materials, like for example, acrylic type resin, fiber type resin, vinyl type resin, etc., is coated on the front surface of the release film, and the coated layer of the above described coating material, is formed; a release properties possessing resin, for example, fluorine containing resin, silicone, polysiloxane, melamine type resin, urethane type resin, polyolefin resin, ionization radiation curable type poly functional acrylate, polyester, epoxy, titanium chelate, polyimine, etc., resin are coated on the surface of the release type film material, and the above resin cover layer is formed or the above described resin is laminated on the surface of the release film by the extrusion coating method, etc., and a release layer with a thickness in the range of 0.1 ~ 1 microns, is formed on the release type film material.

Regarding the coating method used for the coating of the adhesive agent on the

release film 11, there are no particular limitations, and for example, it is possible that the adhesive agent layer is formed by the roll coating, the die coating, the gravure coating, the comma method, etc., usually used coating methods. Among these methods, the after measurement method, like the comma method, is preferred because of the excellent smoothness properties of the coated surface.

The adhesive sheet according to the present invention is a material that can be manufactured as a single leaf or as a continuous roll.

In the case when the adhesive sheet is manufactured as a continuous roll type material, it is a good option any of the methods here below is used: the method where the adhesive material is coated on the release film and the substrate material is glued on, and then after that, without separating the release film, in the state as it is, it is wound in a roll form, or the method where on the back surface of the substrate material, a release treatment is conducted by using well known materials and methods, etc., and the release type film is removed, and then the adhesive sheet is wound in a roll type form.

Regarding the adhesive sheet where the release type film has been separated and it has been wound in a roll type form, it is a material where at the time of use the release type film is manually removed (there is a contradiction, probably refers to the adhesive sheet with the release film - translator's note).

[Effect]

In the case of the adhesive sheet 1, according to the present invention, it is a sheet that has a large number of adhesive agent protruded bodies 5, and because of that, in the case when it is adhered onto a material 9 subject to the adhesion, the contact surface area between the adhesive agent layer 3 and the material subject to the adhesion, becomes small, and the adhesive force of the adhesive sheet 1 is appropriately reduced, and the separation from the material 9 subject to the adhesion, is easily conducted.

Also, the adhesive agent protruded bodies 5 are provided so that they are protruding in an outward direction from the surface of the adhesive agent base layer 4, and by that, by the application of a light pressure, the adhesive sheet is adhered onto the material 9 subject to the adhesion, only by the adhesive agent protruded bodies 5, and because of that it is temporarily adhered, and especially, if it is pressed hard, it is adhered to the material subject to the adhesion up to the adhesive agent base layer 4, and by that it is truly adhered.

Especially, because the adhesive agent layer 3 is primed, where the adhesive agent protruded bodies 5 and the adhesive agent base layer 4, are formed as one unified body, the adhesive agent protruded bodies 5 are strongly fixed onto the substrate material 2, through the adhesive agent base layer 4, and at the time of the separation

of the adhesive sheet from the material that has been the subject of the adhesion, the adhesive agent protruded parts 5 are removed and it is said that they do not remain on the side of the material 9, that has been the subject of the adhesion.

[Practical Examples]

Here below, more detailed examples will be provided, and the present invention will be explained in more details.

Practical Example 1

On the surface of a release film, that has been manufactured from polypropylene, where on its front surface a large number of semi-spherical shape indented parts with a radius of 25 microns, have been formed by the embossing technological process, an acrylic type 2 solvent adhesive agent with a viscosity of 3000 cPa, is coated so that it fills the semi-spherically shaped indented parts and especially, it forms a thickness of 10 microns from the horizontal surface part of the film, and then after that, the adhesive agent is dried for 1 minute at a temperature of 120°C, and by that the adhesive agent layer was formed. After that, a 38 micron thick film manufactured from polyethylene terephthalate is glued onto the front surface of the above described adhesive agent layer by using a laminator, and by that the adhesive sheet was obtained.

At the time when the release film of the obtained adhesive sheet was removed and the repeat removability properties were tested, there was no adhesive agent remaining on the material that was the subject of the adhesion, and it was possible to be well separated.

[Results from the present invention]

As it has been explained in the above described, in the case of the adhesive sheet according to the present invention, it is a material where a large number of adhesive agent protruded bodies are provided so that they are protruding in the outward direction from the adhesive agent layer, and so that they form one unified body with the adhesive agent base layer, and by that, because the adhesive agent protruded bodies are strongly fixed and held to the substrate material through the adhesive agent base layer, at the time when the adhesive sheet is separated from the material that has been the subject of the adhesion, compared to the adhesive sheets according to the previous technology, it is a material where there is no remaining adhesive agent on the side of the material that has been the subject of the adhesion, and an appropriate separation can be conducted.

And especially, regarding the manufacturing method according to the present invention, it is a method where on the front surface of a release film material that has a large number of indentations, an adhesive agent is coated so that its coating

thickness is higher than the depth of the indented parts, and after that, the substrate material is glued. And because of that, compared to the manufacturing method for the preparation of adhesive sheets in the case of the previous technology, it is a simple manufacturing method, and by this method it is possible to produce an adhesive sheet material with good release properties, with high manufacturing efficiency properties and it is possible to produce a product with consistent quality.

According to the manufacturing method of the present invention, on the front surface of the release film that has indented parts, an adhesive agent is coated with a thickness that is larger than the depth of the indented parts, and by that, it is a method whereby it is possible to form together, as one body with the adhesive agent base layer, adhesive agent protruded bodies that are protruding in the outward direction from the front surface of the adhesive agent base layer. And because of that the technological process for the formation of the adhesive agent protruded bodies as a separate body, becomes unnecessary, and the shape of the obtained protruded bodies is also even, and the the productivity properties, the product quality consistency properties are improved.

Especially, because a release film is used that has indented parts, by changing the shape of the release film, it is possible to vary the shape of the adhesive agent protruded bodies, and because of that depending on the type etc., of the material that is being subjected to the adhesion, it is possible to easily change the release properties.

4. Simple explanation of the figures

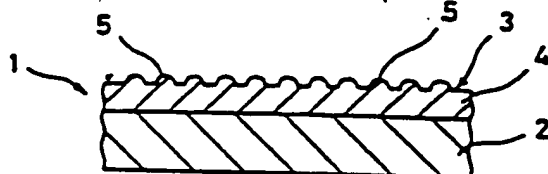
Figure 1 is a longitudinal cross sectional view diagram showing one example of the adhesive sheet according to the present invention. Figure 2 is a longitudinal sectional view diagram of an example of the use of the adhesive sheet according to the present invention. Figure 3 (a) ~ (c) is a diagram explaining the manufacturing method for the preparation of the adhesive sheet according to the present invention.

- 1.....adhesive sheet
- 2.....substrate material
- 3.....adhesive agent layer
- 4.....adhesive agent base layer
- 5.....adhesive agent protruded bodies
- 10.....indented parts
- 11.....release film

Patent Assignee: Dainippon Printing Company

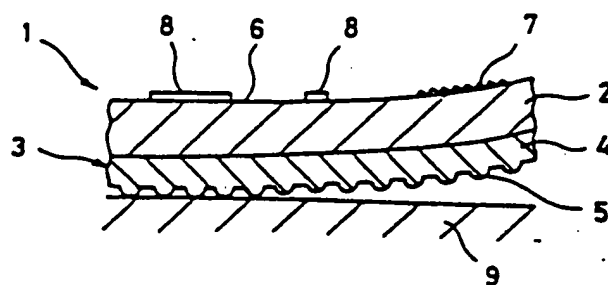
Translated by Albena Blagev ((651) - 735-1461 (h), (651) - 704-7946 (w))

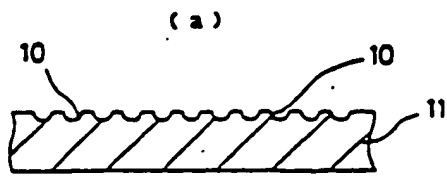
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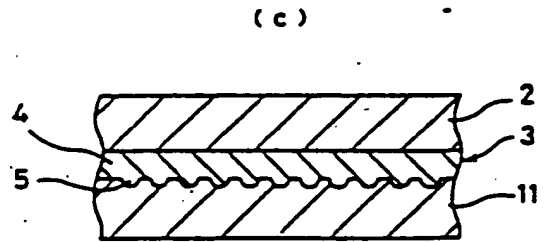
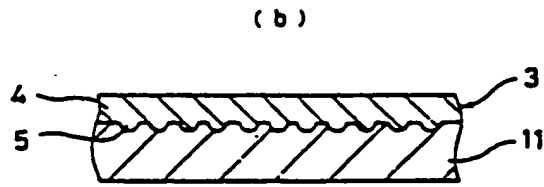
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第 2 図





10...凹部
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54. Name of invention: Manufacturing Method for Pressure Sensitive Waterproof Sheet

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Detailed Explanations

1. Name of Invention

Manufacturing method for pressure sensitive waterproof sheet

2. Patent Claims

(1) Manufacturing method for pressure sensitive waterproof sheet which involves formation of an indented and protruded surface on a peel-able sheet which is then temporary attached to the adhesive surface, the indented and protruded surface of the peel-able sheet is next placed against the adhesive surface of an (unformed) pressure sensitive waterproof sheet, pressure is applied on the two sheets, producing a (formed) pressure sensitive sheet.

3. Detail Explanation of Invention

This invention concerns the manufacturing method for a pressure sensitive waterproof sheet, specifically, it concerns waterproof sheet which is attached to a base material by pressure sensitive adhesive, such as roofing sheet, etc..

Usually, a waterproof sheet is laying on a surface which requires waterproofing; usage of such waterproof sheet is very desirable, because the watertightness of the pressure sensitive adhesive joint and the excellent adhesion with the foundation surface.

However, the waterproof sheet, mentioned above, when it is installed on a foundation which has a very large and smooth surface, air is trapped between the sheet and the foundation; during pressing, such air move around, complete adhesion can not be obtained; also gas may be evaporated from the foundation by heating and retained between the sheet and the foundation surface, as a result, full adhesion can not be achieved.

In order to resolve such problems, attempts have been made to expel the internally entrapped air through grooves forming on the adhesion surface; however, the adhesion surface, usually is very soft and pliable, grooves formed during manufacturing are disappearing naturally during storage over time, they often become totally useless during application of the sheet.

In view of the problems mentioned above, the objective of this invention is to provide a manufacturing method which allow the formation of entrapped air expulsion grooves on the adhesive surface of a waterproof sheet, also the grooves will not disappear after prolong storage; the manufacturing method is characterized by first, temporarily attach a peel-able sheet with indented and protruded surface to the adhesive surface (of the waterproof sheet), next, the sheets are pressed with the indented and protruded surface of the peel-able sheet facing the pressure sensitive adhesive of the waterproof sheet.

Following is an explanation of this invention using an application example.

Figure 1 is a process sketch of this invention.

The manufacturing method of waterproof sheet of this invention involved: first, a synthetic high molecular weight sheet of un- or non-vulcanized rubber, or a synthetic high molecular weight sheet with an adhesive layer was prepared by conventionally methods; indented and protruded surface 4A were formed on a peel-able sheet 3, using grooves forming rolls 4, and 4', which was then temporary attached over the adhesive surface 2 of a pressure sensitive waterproof sheet 1; next, with the indented and protruded surface 4A of the peel-able sheet 3 facing the adhesive surface 2 of the pressure sensitive waterproof sheet 1, the two sheets were pressed together with press rolls 5 and 5', allowing the indented and protruded surface 4A temporarily and strongly bit into the adhesive surface 2.

In the application example above, where an indented and protruded surface 4A was formed on the peel-able sheet 3, it was shown that the indented and protruded surface were formed from both inside and outside; however, as shown in Figure 2, the indented and protruded surface 4A may also be formed from just one side.

During its application, the peel-able sheet 3 is peeled off from the pressure sensitive waterproof sheet 1, manufactured by the method mentioned above, which is then spread out and installed on area where it is needed.

At this time, the grooves 2A, which are formed by the indented and protruded surface 4A on the peel-able sheet 3, on the pressure sensitive adhesive surface, allow the air entrapped between the foundation surface and the sheet to be expelled, making uniform adhesion possible.

In this invention, because the pressure sensitive waterproof sheet which is constructed as mentioned above, have corresponding indented grooves, formed by the indented and protruded surface on the peel-able sheet, and during prolong storage, the peel-able sheet is fit into the adhesive layer such that the grooves in the adhesive layer will not be disappearing. During application, the sheet can be reliably spread out and attached. Also, during application of the sheet of this invention, one may simply apply a roller and press over a peel-able paper, it is very cost effective, as well as having many other advantageous effects.

4. Brief Explanation of Figures

Figures 1 and 2 are sketches explaining process involved in this invention.

Where 1 is a pressure sensitive sheet, 2 is the pressure sensitive adhesive surface, 3 is a peel-able sheet, 4 are groove forming rolls, and 4A is the indented and protruded surface.

Representative: Attorney, Minoru SHIMIZU

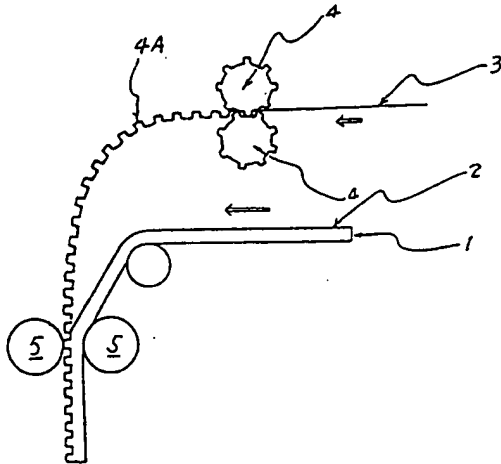


Figure 1

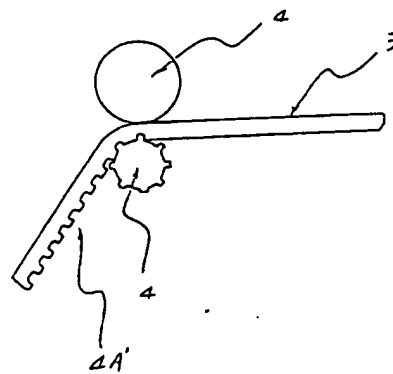


Figure 2

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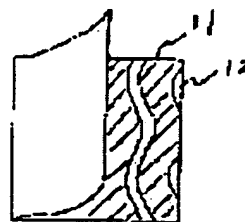
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(72)Inventor : OSHIMA MASATOSHI

(54) SELF-ADHESIVE TAPE OR SHEET AND METHOD FOR APPLYING SELF-ADHESIVE**(57)Abstract:**

PURPOSE: To provide a self-adhesive tape or sheet which allows air bubbles involved to easily go out on adhering to an adherend, enables accurate bonding, and does not cause rolling up of the hem of a substrate after adhered and to provide a method for applying a self-adhesive wherein a self-adhesive layer having a wavy-line pattern is formed for producing the self-adhesive tape or sheet.

CONSTITUTION: This self-adhesive tape or sheet comprises a substrate and a self-adhesive layer 11 which is formed on one side of the substrate and has a wavy-line pattern. The method for applying a self-adhesive comprises forming a layer of an acrylic-emulsion-based self-adhesive on a rotating coating roll of a two-roll coater consisting of the coating roll and a back-up roll, moving a comb blade placed on the coating roll periodically in the direction of the roll shaft to give the self-adhesive layer a wavy-line pattern, and transferring the layer to a release sheet.

**LEGAL STATUS**

[Date of request for examination]

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CLAIMS

[Claim(s)]

[Claim 1] The adhesive tape or sheet characterized by coming to form the binder layer which becomes one side of a base material from a wavelike line pattern.

[Claim 2] In 2 roll coaters which consist of a back up roll and a coating roll By pressing a comb-like blade on the above-mentioned coating roll, and carrying out a periodic move in parallel to the above-mentioned coating roll shaft orientations, before making a web imprint this binder, after carrying out adhesion formation of the binder on this revolving coating roll The coating technique of the binder characterized by preparing the binder layer which forms a wavelike line pattern on the above-mentioned coating roll, and subsequently to the above-mentioned web top carrying out imprint formation of this binder layer.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the conceptual diagram showing 7s *****s from a wavelike line pattern.

[Drawing 2] It is explanatory drawing showing the coating technique of making the binder layer which consists of a wavelike line pattern forming.

[Drawing 3] It is explanatory drawing showing the coating technique of making a stripe-like binder layer forming.

[Description of Notations]

11 Binder Layer

12 Fraction without Binder Layer, or Thin Fraction

21 Back Up Roll

22 Coating Roll

23 Binder

24 Web

25 Comb-like Blade

31 Comb Type Knife Coating-Machine Head

32 Stripe-like Binder Layer

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] this invention relates to the coating technique of the binder for manufacturing the adhesive tape or the sheet and this adhesive tape, or sheet which the binder layer which consists of a wavelike line pattern made form on a base material.

[0002]

[Description of the Prior Art] When it sticks on an adherend by giving discontinuous layers, such as an irregularity-like slot, the shape of a stripe, and punctate, conventionally to a binder layer in a pressure sensitive adhesive sheet, the operation as a recess way of the foam involved in between the above-mentioned binder layer and the adherend works, and the report referred to as effective to a cellular omission is made (for example, Provisional-Publication-No. 63**223081 official report).

[0003] Moreover, a gravure coating machine, a knife coating machine, a roll coater, and a comma coating machine are used as a coater used for the above binder layers by manufacture of a usual adhesive tape in a coater as technique of making an irregularity-like slot and a stripe-like binder layer forming, and it was made by installing a spacer in the path clearance section of a coating roll and a back up roll, or making the edge of a blade of the knife of a knife coating machine into the shape of a comb etc.

[0004]

[Problem(s) to be Solved by the Invention] However, there are the following troubles in the above-mentioned technique. That is, in the adhesive tape or sheet which has binder layers, such as the shape of a stripe, and punctate, when the absent fraction by which the laminating of the binder layer is not carried out to a base-material layer carries out the constant-width continuity of the edge of this adhesive tape or a sheet, it can do it according to end condition etc. and this pressure sensitive adhesive sheet is stuck on an adherend, it is that ***** of an adhesive tape or a sheet arises.

[0005] For example, since the fraction in which the binder layer is formed in the shape of a line along with lengthwise, and the fraction which is not formed exist in the case of the adhesive tape which has the binder layer which it comes to form in the shape of a stripe, when it cuts in this orientation, the fraction to which the laminating of the binder layer is not carried out along with lengthwise [of the base-material side edge section] will carry out a constant-width continuity, and will be made.

Moreover, the fraction to which the laminating of the binder layer is not carried out in the base-material side edge section which was cut similarly in the case of the punctate binder layer is being able to do almost continuously.

[0006] Furthermore, when a sublation sheet is a pressure sensitive adhesive sheet by which the laminating is carried out, ***** arises on the sublation sheet of a pressure sensitive adhesive sheet edge for the same ground as the above, there are things, on a product store, it uses very much and ***** is.

[0007] The contamination of the foam is made to escape, in case this invention was made in view of the above points and an adhesive tape or a sheet is stuck on an adherend. After being able to stick

finely and sticking on an adherend, ***** of the base-material side edge section does not occur. It is supplying the manufacture technique which forms the binder layer which has a wavelike line pattern for manufacturing the adhesive tape or the sheet and this adhesive tape, or sheet which ***** of the sublation sheet base-material side edge section does not generate in the status the sublation sheet's having been stuck furthermore on the binder side.

[0008]

[Means for Solving the Problem] this invention is made as a result of inquiring zealously as the technique of solving the above-mentioned trouble.

[0009] That is, the place by which the adhesive tape or sheet of this invention is characterized is coming to form the binder layer which becomes one side of a base material from a wavelike line pattern. Moreover, the place by which the coating technique of the binder of this invention is characterized In 2 roll coaters which consist of a back up roll and a coating roll By pressing a comb-like blade on the above-mentioned coating roll, and carrying out a periodic move in parallel to the above-mentioned coating roll shaft orientations, before making a web imprint this binder, after carrying out adhesion formation of the binder on this revolving coating roll It is the point of preparing the binder layer which forms a wavelike line pattern on the above-mentioned coating roll, and subsequently to the above-mentioned web top carrying out imprint formation of this binder layer.

[0010] Hereafter, the detail of this invention is explained. The binder layer of this invention consists of a wavelike line pattern. Hereafter, it explains along with a drawing. A wavelike line pattern here means not the stripe status that the binder layer of a constant width is located in a line with the plurality in parallel to the shape of a straight line with the fixed spacing like the shape of a line but a periodic curve like a sign curve being parallel with a fixed spacing, and being arranged by the plurality. It prevents generating a pressure sensitive adhesive sheet or a tape continuously [the fraction by which a binder layer is not formed in the base-material layer in the base-material edge cut in arbitrary parts], or almost continuously, when arranged by the line pattern of the letter of a sign curve, and since it does not generate partially even if the fraction in which a binder layer is not formed temporarily arises, starting ***** of a base material is lost.

[0011] The conceptual diagram is shown in drawing 1 . 1 is a fraction in which the binder exists and 2 is a fraction to which the thickness of a binder layer is thin from the fraction or the binder layer 1 without a binder layer. As mentioned above, when it is not necessary to necessarily change 2 into the status that there is no binder and it is stuck on an adherend at least, a thickness difference should just be in the grade which can do the circulation way where the foam escapes from the fraction of a binder 1 between covering dignity and a binder layer when thin [thin].

[0012] As shown in drawing 1 , it will be arranged with the fixed spacing toward an adhesive tape or the orientation of a volume of a sheet by the fraction 2 to which the thickness of a binder layer is thin from the fraction or the binder layer 1 without a part for the binder layer 1, and a binder layer so that a sign curve may be drawn. The fraction 2 to which it is thin thin from the fraction or the binder layer 1 without the binder layer 1 and a binder layer is desirable at the point which there is no nonuniformity in adhesion area and is equalized, when having a fixed spacing mostly and being arranged sticks on an adherend.

[0013] Furthermore, the width of face of the binder layer 1 cannot be overemphasized by that an adhesive-face product becomes large when the direction to take [larger than the fraction 2 to which it is thin thin from the fraction or the binder layer 1 without a binder layer] sticks on an adherend, and an adhesion property becomes good.

[0014] Next, the coating technique of making the binder which consists of a wavelike line pattern forming is explained along drawing 2 . 21 is a back up roll for conveying a web, and 22 is a coating roll for once carrying out adhesion formation of the binder on a roll. After carrying out adhesion formation of the binder 23 on this revolving coating roll 22 in the coating machine which consists of these 2 rolls, Before making a web 24 imprint this binder and carrying out imprint formation of the binder layer on a web 24 It presses on the above-mentioned coating roll 22 turning around the comb-

like blade 25. And by carrying out a periodic move in parallel to the coating roll 22 above-mentioned shaft orientations With the fraction which fails to write a binder 23, as it is ***** -- alternation -- and the binder layer which consists of a wavelike line pattern which consists of a fraction 2 to which it is thin thin from the fraction or the binder layer 1 without the binder layer 1 which will draw a curve with periodicity continuously and is shown in drawing 1 , and a binder layer can be made to form

[0015] As shown in drawing 1 , it is the tabular thing which has an opening in the shape of a slit at a fixed spacing, and in order to be able to use it if the comb-like blade 25 writes a binder and has the possible rigidity and possible solvent resistance of dropping ***** , and not to attach a blemish to the coating roll 22 preferably, what consists of a product made from synthetic resin etc. is good. Moreover, the status press on the coating roll 22 should just set up the clearance with a coating roll from the fraction or the binder layer 11 without a binder layer according to a thickness setup of the fraction 12 to which it is thin thin.

[0016] By the above-mentioned technique, the binder layer which forms a wavelike line pattern on the above-mentioned coating roll 22 by failing to write the binder 23 on the coating roll 22 with a blade 25 is prepared, making a web 24 convey, and, subsequently to the above-mentioned web 24 top, imprint formation of this binder layer is carried out.

[0017] The binder which can be used by this invention can mention the rubber system used for a usual adhesive tape, acrylic, an urethane system, a silicone system, an epoxy system, etc. Moreover, in the case of a direct coating method, the web said here is the base material of an adhesive tape, and, in the case of an imprint application method, means a sublation sheet. As a base material which can be used for this invention, for example, a vinyl chloride system resin, a polyolefine system resin, a polyester system resin, cellophane, kraft paper, etc. can usually be mentioned by the base material used for an adhesive tape or a sheet.

[0018] The marking sheet, the pro theque film of the intended use of the adhesive tape by this invention or a sheet, etc. are effective to sticking finely the base material which has a large area to an adherend.

[0019] In addition, the slit of the double-width pressure sensitive adhesive sheet may be carried out to thin width of face, and you may make it an adhesive tape.

[0020]

[Function] According to the adhesive tape or sheet of this invention, when a binder layer consists of a wavelike line pattern, no matter what how [to cut] it may adopt for this adhesive tape or a sheet, the edge of a base-material layer can prevent the absent fraction of a binder layer occurring continuously.

[0021] Moreover, according to the coating technique of the binder of this invention, it sets to 2 roll coaters which consist of a back up roll and a coating roll. By pressing a comb-like blade on the above-mentioned coating roll, and carrying out a periodic move in parallel to the above-mentioned coating roll shaft orientations, before making a web imprint this binder, after carrying out adhesion formation of the binder on this revolving coating roll The binder layer which forms a wavelike line pattern on the above-mentioned coating roll can be prepared.

[0022]

[Example] Hereafter, the example of this invention is explained. Use the reverse-video coating machine which consists of the 2 rolls shown in drawing 2 , and a polyethylene resin is laminated to both sides of paper as a web. the sublation sheet which comes to prepare a mold release processing layer in the one side -- using it -- binder ***** -- an acrylic emulsion system binder (made in loam & Haas --) Used TK8005, the binder layer which has a wavelike line pattern by carrying out the periodic move of the binder which carried out adhesion formation in parallel to the shaft orientations of a coating roll was made to form on a coating roll, and imprint formation of this binder layer was carried out on the sublation sheet.

[0023] The above-mentioned binder layer was dried and the binder layer which the fraction by which the binder layer the binder layer whose width of face is about 10mm, and whose width of face are

about 2mm is not formed at all by the thickness of 35 micrometers on this film becomes from the wavelike line pattern which it has by turns was made to form by sticking on the soft-polyvinylchloride-resin film manufactured by the calender method of 100 micrometer thickness, and imprinting.

[0024] Thus, the binder side of the created pressure sensitive adhesive sheet had the wavelike line pattern shown in drawing 1. As an example of a comparison, the binder coating method of the shape of a stripe by the knife coating-machine method shown in drawing 3 is shown. It vomits 31, the knife coating-machine head section of a mold is shown, and 21 is a back up roll.

[0025] The sublation sheet same as a web 24 as an example was used, and the stripe-like binder layer 32 was made to form by applying the same binder as an example on a sublation sheet, and drying.

[0026] The binder layer 32 which the fraction by which the binder layer the binder layer whose width of face is about 10mm, and whose width of face are about 2mm is not formed at all by the thickness of 35 micrometers on this film becomes from the shape of a stripe which it has by turns was made to form by sticking the sublation sheet in which the above-mentioned binder layer was made to form on the same soft-polyvinylchloride-resin film as an example, and imprinting it.

[0027] The pressure sensitive adhesive sheet of the example created by the above was cut into 30x30cm angle, and as a result of performing the test which removes a sublation sheet and is stuck on an acrylic plate, it was able to stick finely, without cellular ***** occurring. furthermore -- even if the above-mentioned pressure sensitive adhesive sheet sticks and it also grinds a doubling edge by hand -- being turned over -- it was not generated at all

[0028] Moreover, when the pressure sensitive adhesive sheet of the example of a comparison was checked by the test by the same technique, after the omitted part stuck on the adherend in the fraction in which a binder layer is not formed, ***** of an edge arose.

[0029]

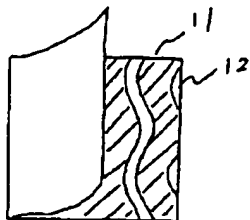
[Effect of the Invention] As mentioned above, even if the circulation way which becomes a gaseous byroad will be made between an adherend and a binder side and the contamination of the foam is in it when sticking on a desired adherend since it comes to form the binder layer which becomes one side of a base material from a wavelike line pattern according to the permeability adhesive tape or sheet of this invention as explained in full detail, a cellular omission is made simply and can stick finely.

[0030] **** -- after sticking on an adherend, it can prevent that ***** of an adhesive tape or the base-material edge of a sheet occurs Furthermore, it can prevent that ***** of a base-material edge occurs like the above at the time of a product archive in the status that the sublation sheet was stuck.

[0031] Furthermore, according to the coating technique of the binder of this invention, the binder layer which forms a wavelike line pattern can be prepared, and a manufacture of the above-mentioned adhesive tape or a sheet is enabled.

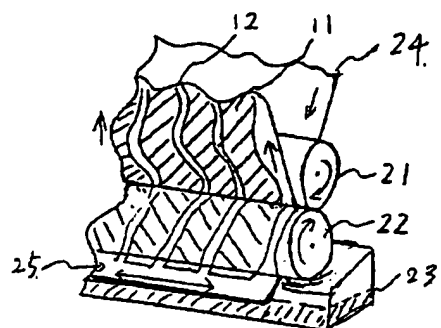
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Drawing selection Drawing 1



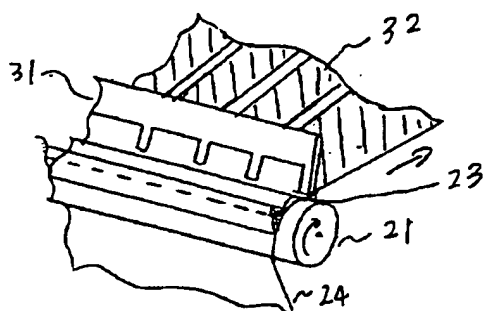
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Drawing selection Drawing 2



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Drawing selection Drawing 3



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